

**Appendix B – Submission Check List****State Highways and Local Roads Checklist  
for Hydraulics and Drainage Design Reviews**

The following is a checklist to be completed and included with all State Highways and Local Roads projects that have hydraulics and drainage involvement. To expedite the review process, meet project schedules, and avoid possible delays due to incomplete design submissions, the following checklist outlines the necessary material (for each design phase) that should be provided to the Hydraulics and Drainage Section for review. Also, approximate review time frames with each submission are provided for the designer to consider. The procedures and criteria of the current Consulting Engineers Manual, Bridge Design Manual, and Drainage Manual should be followed with special attention to Sections 302, 303, 304, 403, 404, 502, 707, 711, 712, 713, 802, and 804 of the Consulting Engineers Manual; Sections 2, 5, 11, and 13 of the Bridge Design Manual; and all the sections within the Drainage Manual.

The following checklist(s) are to be submitted for all design projects at the appropriate design phases:

**Scope Review Meeting/Permit Determination Request**

**Preliminary Design Checklist (Plans 35% Complete)**

**Drainage Design Checklist (Plans 50% Complete) – *If Necessary***

**Semi-Final Design Checklist (Plans 60% to 70% Complete)**

**Final Design Checklist (Plans 85% to 90% Complete)**

<b>Project No.</b>	_____
<b>Roadway</b>	_____
<b>Town</b>	_____
<b>Date</b>	_____
<b>Signature of Engineer</b>	_____

**Scope Review Meeting/Permit Determination Request**

*Allow a 2-3 week review time.*

- a.** Project description with a brief statement of hydraulics and drainage involvement.  
☐ Included                      ☐ N/A
- b.** Request for determination of permit involvement.  
☐ Included                      ☐ N/A
- c.** Location plan.  
☐ Included                      ☐ N/A
- d.** Available plans, profiles, cross sections, etc...  
☐ Included                      ☐ N/A

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<b>Signature of Engineer</b>	_____

### **Preliminary Design Checklist (Plans 35% Complete)**

*Allow a 3-4 week review time.*

The Preliminary Design Submission should include the following:

#### **a. Preliminary Design Statement**

The design statement should contain a narrative for the following:

1. Description of hydraulics and drainage involvement.
 

<input type="checkbox"/> Included	<input type="checkbox"/> Not Included	<input type="checkbox"/> Not Applicable
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2. A list of existing culvert or bridge crossings for tributary areas:
  - a.)  $> 81$  ha (200 Acres) and  $< 2.59$  km<sup>2</sup> (1 mi<sup>2</sup>)
  - b.)  $> 2.59$  km<sup>2</sup> (1 mi<sup>2</sup>)

<input type="checkbox"/> Included	<input type="checkbox"/> Not Included	<input type="checkbox"/> Not Applicable
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3. Available fish passage information from the ConnDEP Fisheries Division.
 

<input type="checkbox"/> Included	<input type="checkbox"/> Not Included	<input type="checkbox"/> Not Applicable
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4. Water diversions.
 

<input type="checkbox"/> Included	<input type="checkbox"/> Not Included	<input type="checkbox"/> Not Applicable
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5. Justification for drainage design not consistent with the Drainage Manual criteria.
 

<input type="checkbox"/> Included	<input type="checkbox"/> Not Included	<input type="checkbox"/> Not Applicable
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6. List of permit requirements (ie: FPM, SCEL, DAM, CAM, etc...).
 

<input type="checkbox"/> Included	<input type="checkbox"/> Not Included	<input type="checkbox"/> Not Applicable
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7. Required detention designs.
 

<input type="checkbox"/> Included	<input type="checkbox"/> Not Included	<input type="checkbox"/> Not Applicable
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8. Any unusual designs such as pumping stations.
 

<input type="checkbox"/> Included	<input type="checkbox"/> Not Included	<input type="checkbox"/> Not Applicable
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9. Tidal Involvement.
 

<input type="checkbox"/> Included	<input type="checkbox"/> Not Included	<input type="checkbox"/> Not Applicable
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10. Investigation of existing drainage concerns and/or problems. Contact Town/City maintenance departments for local road projects or ConnDOT Maintenance departments and district drainage engineer for State highway projects.
 

<input type="checkbox"/> Included	<input type="checkbox"/> Not Included	<input type="checkbox"/> Not Applicable
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**b. Plans, Profiles and available Cross Sections**

1. Watercourses, perennial and intermittent should be shown and labeled.  
☐ Included                      ☐ Not Included                      ☐ Not Applicable
2. Special drainage provisions such as sedimentation basins and/or non standard drainage structures.  
☐ Included                      ☐ Not Included                      ☐ Not Applicable
3. Approximate slope limits.  
☐ Included                      ☐ Not Included                      ☐ Not Applicable
4. Taking lines and property lines.  
☐ Included                      ☐ Not Included                      ☐ Not Applicable
5. Existing ground line and existing structures.  
☐ Included                      ☐ Not Included                      ☐ Not Applicable
6. Existing drainage rights from survey information.  
☐ Included                      ☐ Not Included                      ☐ Not Applicable
7. Preliminary conceptual layout of proposed drainage system including channels, ditches and swales.  
☐ Included                      ☐ Not Included                      ☐ Not Applicable
8. FEMA 100 year floodplain and/or SCEL shown and labeled.  
☐ Included                      ☐ Not Included                      ☐ Not Applicable

**c. Watershed Area Map**

1. An overview contour map (100 or 200 scale contour map or USGS 2000 scale topographic map) for the project showing watershed areas for all cross culverts.  
☐ Included                      ☐ Not Included                      ☐ Not Applicable

**d. Structures with drainage areas > 2.59 km<sup>2</sup> (1 mi<sup>2</sup>)**

1. Hydrology computations determining the drainage area and design discharge.  
☐ Included                      ☐ Not Included                      ☐ Not Applicable
2. Preliminary hydraulic and scour computations for the structure type study alternatives (the above hydrology computations must be approved prior to the start of the preliminary hydraulic computations).  
☐ Included                      ☐ Not Included                      ☐ Not Applicable

Provide justification for items **Not Included**. Justification should correspond to letter and number (e.g.: **a.1.**, **b.1.**, **c.1.**, etc...).

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<b>Signature of Engineer</b>	_____

### **Drainage Design Checklist (Plans 50% Complete)**

*Allow a 6-8 week review time*

See **Note** below.

### **Semi-Final Design Checklist (Plans 60% to 70% Complete)**

*Allow a 5-6 week review time*

**Note:** A separate, earlier drainage submission (at approximately 50% completion) may be required if the drainage design is particularly complicated, requires significant right of way and/or otherwise might jeopardize the schedule of the project. **This checklist MUST accompany both of these submissions.**

*Indicate which submission this checklist is for and include the following information:*

☐ *Drainage Design Submission*

☐ *Semi-Final Design Submission*

#### **a. Draft Drainage Report**

- Disposition of Preliminary Design/Drainage Design Submission comments with written responses justifying comments not incorporated.  
☐ Included                      ☐ Not Included                      ☐ Not Applicable
- A condition survey of the existing drainage pipes and structures that are to remain in use should be investigated for structural adequacy and documented. (See Section 3.6.3.)  
☐ Included                      ☐ Not Included                      ☐ Not Applicable
- The condition of existing ditches that are to remain in use should be field inspected, analyzed and results documented to verify their stability and the need for cleaning and reshaping.  
☐ Included                      ☐ Not Included                      ☐ Not Applicable
- The condition of the outlet at the existing discharge points should be investigated and documented to ensure no erosion or sediment problems exist. If outlet protection is required, it should be incorporated into the project and computations submitted.  
☐ Included                      ☐ Not Included                      ☐ Not Applicable

5. A condition survey report including items 2, 3, and 4 above. (See Appendix A and B, Chapter 4)  
☐ Included ☐ Not Included ☐ Not Applicable
6. Drainage design computations should include gutter flow analysis, storm sewer design, and hydraulic gradeline (HGL). The hydraulic gradeline should be analyzed to ensure 0.3m (1 ft) freeboard is maintained at drainage structures. This analysis should consider all friction, entrance, junction, exit and bend losses. Designer to verify that the proposed drainage will not adversely impact the existing downstream storm system or property owners. (See Chapter 11, Storm Drainage Systems.)  
☐ Included ☐ Not Included ☐ Not Applicable
7. Drainage computations should identify structures by station and offset rather than by a numerical identifier. If station and offset is not feasible for the computations then include an index with the location of the structure corresponding to its numerical identifier. The watershed map should be prepared accordingly.  
☐ Included ☐ Not Included ☐ Not Applicable
8. Existing drainage systems shall be analyzed for hydraulic adequacy to meet the proposed conditions and, if found inadequate, an upgrade will be designed in conformance with the criteria established in the Drainage Manual.  
☐ Included ☐ Not Included ☐ Not Applicable
9. All roadway drainage systems should be brought to a suitable outlet.  
☐ Included ☐ Not Included ☐ Not Applicable
10. If upgrading of pipes downstream of the project is necessary, then additional rights may need to be acquired.  
☐ Included ☐ Not Included ☐ Not Applicable
11. The need for temporary drainage should be addressed. Temporary drainage computations should be prepared in accordance with criteria in the Drainage Manual. (See Section 3.6.11.)  
☐ Included ☐ Not Included ☐ Not Applicable
12. Proposed swales, ditches and channels should be designed in accordance with HEC-15 for discharges 1.42 m<sup>3</sup>/s (50 ft<sup>3</sup>/s) and less or HEC-11 for discharges in excess of 1.42 m<sup>3</sup>/s (50 ft<sup>3</sup>/s). (See Chapter 7, Channels.)  
☐ Included ☐ Not Included ☐ Not Applicable
13. Minor and small cross culvert design computations with culvert data sheet. (See Chapter 8, Culverts.)  
☐ Included ☐ Not Included ☐ Not Applicable
14. Topographic mapping with watershed area delineated for each inlet and/or cross culverts as required to perform the drainage calculations. The flow path used in the time of concentration calculation and coefficient of imperviousness should be shown for each area. (See Chapter 6, Hydrology.)  
☐ Included ☐ Not Included ☐ Not Applicable
15. Diversion identified.  
☐ Included ☐ Not Included ☐ Not Applicable
16. All plans, computations and reports identify the responsible engineers who prepared and checked the work.  
☐ Included ☐ Not Included ☐ Not Applicable

**b. Plans, Profiles and Cross Sections**

1. The existing and proposed storm drainage shown to their outlets.  
☐ Included ☐ Not Included ☐ Not Applicable
2. Size and type of existing drainage pipes/structures and disposition of pipes/structures to be abandoned.  
☐ Included ☐ Not Included ☐ Not Applicable
3. Properties affected by diversions should be shown on the plans so that proper rights can be acquired.  
☐ Included ☐ Not Included ☐ Not Applicable
4. Drainage Rights and Easements.  
☐ Included ☐ Not Included ☐ Not Applicable
5. Outlet Protection shown on plans and details provided.  
☐ Included ☐ Not Included ☐ Not Applicable
6. Intersection grading plans to ensure inlets are located at the low points to alleviate ponding/icing conditions. Top of frame elevation should be shown.  
☐ Included ☐ Not Included ☐ Not Applicable
7. In areas where cross culverts are being extended, replaced, or where outlet protection is proposed a profile or cross section of the natural ground should be provided to show how the inverts will tie into the existing topography.  
☐ Included ☐ Not Included ☐ Not Applicable
8. The top of frame and invert elevations for each storm drainage structure shown. Proposed drainage structures shall be identified by station and offset on cross sections.  
☐ Included ☐ Not Included ☐ Not Applicable
9. Existing and proposed drainage patterns (flow arrows) of pipes, ditches, channel and swales.  
☐ Included ☐ Not Included ☐ Not Applicable
10. Details for any special drainage structures not found in the Standard Drawings.  
☐ Included ☐ Not Included ☐ Not Applicable
11. The direction of flow should be shown by arrows to 61m (200 ft.) beyond any drainage outlet, or shown to terminate by dissipation or entrance into a watercourse or body of water.  
☐ Included ☐ Not Included ☐ Not Applicable

**c. Structures with drainage areas > 2.59 km<sup>2</sup> (1 mi<sup>2</sup>)**

1. Draft hydraulic design report.  
☐ Included ☐ Not Included ☐ Not Applicable
2. Draft scour report when the proposed structure spans the waterway.  
☐ Included ☐ Not Included ☐ Not Applicable
3. Draft floodway report.  
☐ Included ☐ Not Included ☐ Not Applicable
4. Draft SCEL report.  
☐ Included ☐ Not Included ☐ Not Applicable
5. Draft scour report if required.  
☐ Included ☐ Not Included ☐ Not Applicable

Provide justification for items **Not Included**. Justification should correspond to letter and number.

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<b>Designed By</b>	_____
<b>Signature of Engineer</b>	_____

**Final Design Checklist (Plans 85% to 90% Complete)***Allow a 4-5 week review time.*

The Final Design Submission should include the following:

- |  |                                   |                                       |   |
|--|-----------------------------------|---------------------------------------|---|
| <b>a.</b> Disposition of Semi-Final Design comments with written responses justifying comments not incorporated. | <input type="checkbox"/> Included | <input type="checkbox"/> Not Included | <input type="checkbox"/> Not Applicable |
| <b>b.</b> Final Drainage Report and Final Plans.   | <input type="checkbox"/> Included | <input type="checkbox"/> Not Included | <input type="checkbox"/> Not Applicable |
| <b>c.</b> Final scour report.  | <input type="checkbox"/> Included | <input type="checkbox"/> Not Included | <input type="checkbox"/> Not Applicable |
| <b>d.</b> Final floodway analysis report.  | <input type="checkbox"/> Included | <input type="checkbox"/> Not Included | <input type="checkbox"/> Not Applicable |
| <b>e.</b> Final SCEL report.   | <input type="checkbox"/> Included | <input type="checkbox"/> Not Included | <input type="checkbox"/> Not Applicable |
| <b>f.</b> Final hydraulic design report.   | <input type="checkbox"/> Included | <input type="checkbox"/> Not Included | <input type="checkbox"/> Not Applicable |

Provide justification for items **Not Included**. Justification should correspond to the designated letter.

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